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At the beginning of the XXth century the high rate of analphabetism and the recent unification of the country, achieved only in 1870, had required a vast program of school and university reforms which were accompanied by a debate on two fundamental questions: whether the university should depend on public funds or become autonomous, and whether the curriculum should be specialized or remain general as in the modern era. The 1859 Casati reform had separated the faculty for literature and philosophy from the faculty for mathematical, physical and natural sciences, thus introducing for the first time specialized curricula. The huge debate on the 1882 Baccelli's reform, aiming at reintroducing a unique faculty, involved political, scientific and financial issues, and arose the question of the relations between State centralism and local universities, both on an administrative and a didactic level. Under the influence of positivism, many mathematicians appreciated the specialization introduced by Casati but suggested to reintroduce a bridge between the two cultures activating courses in philosophy or history of sciences in all faculties. The tension between a specialized and an interdisciplinary approach to knowledge was not limited to the discussion on the didactic reform of universities (and secondary schools), but emerged in scientific research too.

The group of mathematicians who studied or worked in Turin under the supervision of Giuseppe Peano between the end of the XIXth century and the beginning of the XXth century is an interesting case study in this respect: on the one hand, they were highly specialized in logic and the foundation of mathematics, on the other hand they had multidisciplinary interests in linguistic, psychology, history of sciences and philosophy, philology and politics. A new kind of scientific collaboration was set up in the edition of the *Formulario*, a dictionary of mathematics that aimed at giving an axiomatic presentation of different mathematical disciplines by introducing a unique symbolism and a universal language (*latino sine flexione*), and that evolved like a modern *wiki* thanks to the suggestions sent by the editors in chief and by the readers themselves. In particular, one of the mathematicians of the group, Giovanni Vailati (1863-1911), applied a truly interdisciplinary approach to the research into several fundamental epistemological questions, including the nature of definitions, the role of technical language, and the properties of scientific method and justification. Vailati's broad correspondence with major scholars in different fields and the development of an original form of pragmatism should be taken into account in order to understand the conception of knowledge that underpins his interdisciplinary approach.

As an example of this approach, I consider the case of definitions, which was analysed from several different perspectives by Peano and the Turin scholars at the three International Conferences that took place in Paris in 1900 and that impressed the young Bertand Russell, who was to declare that the meeting with Peano was "a turning point in his intellectual life". At the International Conference for Philosophy, Giuseppe Peano investigated the conventional nature of definitions and the notion of primitive concepts in mathematics, Burali-Forti analysed the differences between several kinds of definitions used in science (by abstraction, by postulates, nominal), Alessandro Padoa introduced a logical criterion for definability, Giovanni Vailati discussed the problems concerning the definition, demarcation and classification of sciences. At the International Conference for Mathematics, Alessandro Padoa discussed the definition of natural numbers and the principles of geometry. At the International Conference for Psychology Vailati related the classification of mental states to the distinction between definitions and judgements of value. In a few other works Giovanni Vailati further developed the analysis of definitions not only from the perspective of mathematics, logic, philosophy and psychology, but also from the point of view of history of sciences, history of philosophy, pragmatic education theories, and linguistics.

The interdisciplinary approach developed by Giovanni Vailati and the Turin group, which amounted to a research practice rather than a fully explicit didactic theory, can be interestingly compared with a brand new French education project (*Licence Sciences et Humanités*) developed by a group of teachers and researchers of the Aix-Marseille University. The new course in Science and Humanities starting in 2012 abandons the disciplinary organisation of the curriculum, which became widespread in European countries at the end of the XIXth century as a result of Positivism, Napoleonic inheritance and Prussian education models. The curriculum is organized around five major themes: 1) nature and culture, 2) logic, language and calculus, 3) world systems, 4) figures of political juridical and economical power, 5) optics, vision and colors. Involved disciplines are linguistics, informatics, biology, philosophy, history, neurosciences, physics and mathematics. The common epistemological perspective concerns the constitution and transmission of knowledge, evaluated at three stages of human history: the birth of Greek science, the modern scientific revolution, and the scientific turn developed between the end of the XIXth and the beginning of the XXth century.

My interest in comparing this project and Vailati's research practice is epistemological rather than sociological or educational: I aim at verifying whether there is a connection between the interdisciplinary approach to fundamental scientific problems, and an epistemological conception of what knowledge is or should be. To answer this question, one has to understand what role is played by philosophy, history, and mathematics in the desired unification of sciences. Vailati's interdisciplinary practice and broad correspondence made him into an European "intellectual": does the new educative project aim at forming a new class of intellectuals that might unify theory and practice, social and life sciences, art and technology? A question that was raised at the time of Vailati is often raised nowadays too: is the movement towards the unification of knowledge and the trespassing of barriers created by hyper-specialization, the result of a nostalgic attitude towards the past, or is it capable of promoting innovative and original research? The latter was surely the case in the Italian context at the beginning of the century, before Gentile's reform introduced a rigid division between the two cultures.

Références

Arrighi C., Cantù P., De Zan M. and Suppes P. (eds.), *Logic and Pragmatism Selected Writings of Giovanni Vailati*, CSLI Publications, Stanford, 2009, pp. XXI-LXVII.

De Zan, Mauro (ed.), *I mondi di carta di Giovanni Vailati [Giovanni Vailati's Worlds of Paper]*, FrancoAngeli, 2000.

De Zan, Mauro, *La formazione di Giovanni Vailati [Giovanni Vailati's Education]*, Congedo, 2009.

Marcato, Stefano, *Lineamenti dell'ordinamento universitario negli ultimi 150 anni [Outline of the university system in the last 150 years]*, in Università/notizie (USPUR) 3 (2009).

Minazzi, Fabio (ed.), *Giovanni Vailati intellettuale europeo [Giovanni Vailati: an European Intellectual]*, Thélema, 2006.

Projet de Licence Transdisciplinaire Mention « Sciences et Humanités », Aix-Marseille Université 2011.

Roero Clara Silvia (ed.), *Peano e la sua scuola fra matematica, logica e interlingua. Atti del congresso internazionale di studi [Peano and His School: Mathematics, Logic and Interlingua. International Proceedings]* (Torino, 6-7 ottobre 2008), Torino, Deputazione subalpina di storia patria, 2010.

Simeti, Martina, "La "triplice autonomia" delle Università. La riforma Baccelli vista nelle pagine dei giornali [The 'threefold tutonomy' of Universities. The Baccelli Reform from the point of view of contemporary newspapers]", in *Rassegna storica del Risorgimento,* Italia, Storia amministrativa, Secolo XIX, ottobre-dicembre 2000, pp. 509-538.